

# PITCH-YIELDING TREES OF THE COLOMBIAN AMAZONIA

BY  
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WHILE in the northwest Amazon, I was repeatedly impressed by the important role which various resinous pitches play in the daily lives of the Indians of the area. A study of some of the trees which are most commonly used as sources of pitch has not only yielded interesting ethnobotanical data but has also brought to light several apparently hitherto undescribed specific and varietal concepts.

Sundry resiniferous plants are used by the Indians of the northwest Amazon for domestic purposes. Important amongst these plants are *Couma macrocarpa* Barb.-Rodr. of the *Apocynaceae* (the resin of which is extensively employed in caulking canoes), *Protium heptaphyllum* L. of the *Proteaceae* (the brittle and aromatic resin of which is sometimes added to clay for making pots) and several species of *Manilkara* and *Ecclinusa* of the *Sapotaceae*.

Notwithstanding the utilization of these and other plants, attention in this paper will be directed principally to three closely allied genera of the tribe *Moronobeae* of the *Guttiferae*: *Moronobea*, *Platonia* and *Symphonia*. Field studies have indicated that trees of these genera are, for most domestic uses, preferred by the natives of the northwest Amazon over all other species which yield

pitch. A review of the literature indicates that the slight amount of attention which these genera have received is hardly commensurate with their economic importance to human life in the Amazon forests. Since the latexes of all three of these genera are similar in consistency and uses (in some cases having the same native name), they are treated here together. It appears, nevertheless, that the several species of *Symphonia* are the most important pitch-plants amongst the Indians of Amazonian Colombia.

**Moronobea coccinea** Aublet Hist. Pl. Guy. Fran. (1775) 788, t. 313 excl. figs. a-f.

Aublet, in describing *Moronobea coccinea* in 1775 ("Histoire des Plantes de la Guyane Française" (1775) 792), stated that the Caribs ("Galibis") utilized the resin of the tree to glue on the points and poisonous teeth of their arrows. The tree as well as its resin was called *mani* in French Guiana. The common name *mani* is likewise employed for the pitch of *Moronobea coccinea* in Surinam (van Cappelle, H.: "Au travers des forêts vierges de la Guayane Hollandaise" (1905) 26).

Working in the upper Orinoco basin in Venezuela at the turn of the 18th century, Humboldt (Humboldt, A.: "Personal narratives of travels to the equinoctial regions of America" 2 (1900) 357) found the extraction of resin from *Moronobea coccinea* to be a flourishing industry at Javita, a small town on the Río Temi (an affluent of the Río Atabapo). He wrote:

. . . In the forests of those burning climates (where there is neither pine, thuya, taxodium, nor even a podocarpus), resins, balsams and aromatic gums are furnished by the *Moronobea*, the icica and the amyris. The collecting of these gummy and resinous substances is a trade in the village of Javita. The most celebrated resin bears the name of *mani*; and of this we saw masses of several hundred-weight, resembling colophony and mastic. The tree called *mani* by the Paraginis, which M. Bonpland believes to be the *Moronobea coccinea*, furnishes but a

small quantity of the substance employed in the trade with Angostura. The greatest part comes from the *mararo* or *caragna*, which is an amyris. It is remarkable enough that the name *mani*, which Aublet heard among the Galibis [Caribs] of Cayenne, was again heard by us at Javita, three hundred leagues distant from French Guiana. The *Moronobea* or *Symphonia* of Javita yields a yellow resin; the *caragna*, a resin strongly odoriferous and white as snow; the latter becomes yellow where it is adherent to the internal part of the old bark.

At the hamlet of Pimichín, near Javita, Humboldt spent the night at a pitch-gatherers' camp (*loc. cit.* 368) and was able personally to see evidence of this forest industry:

We passed the night in a hut lately abandoned by an Indian family . . . A great store of *mani* (a mixture of the resin of the *Moronobea* and the *Amyris Caraña*) was accumulated around the house. This is used by the Indians here, as at Cayenne, to pitch their canoes and fix the bony spine of the ray at the points of their arrows.

The Kubeo and Desano Indians along the Río Vaupés and its Colombian affluents gather quantities of the pitch from *Moronobea coccinea* (which seems to be much more abundant from Mitú downstream than in the headwaters of the river) for making huge torches for the lighting of their large communal houses during tribal dances. Compact lumps of the dried, blackened pitch are heated and applied to the tops of small posts driven into the earthen floor. When ignited, the pitch gives off a surprisingly bright light. The Tanimukas and Yukunas sometimes employ the pitch of this species in the manufacture of dancing-masks, but the preferred resin for this purpose is that from *Symphonia*.

COLOMBIA: Comisaría del Amazonas, Trapecio Amazónico, interior regions of trapecio between Amazon and Putumayo watersheds. Alt. above 100 m. November 1946, *George A. Black & Richard Evans Schultes* 46-369.—Comisaría del Vaupés, Río Vaupés, Mitú and vicinity. Alt. about 250 m. "Columnar tree, 1½ feet in diameter. Height 90 feet. Crown sparse, all at top. Bark thick, soft, roughish, brown outside, sandy inside. Latex abundant, yellow. Wood yellowish white. Flowers rose-red. Tukano = *woo-há-pee-ka-ne*; Taiwano = *go-hé*." Septem-

ber 8, 1951, *Richard Evans Schultes & Isidoro Cabrera 13960*.—Comisaría del Amazonas, Río Caquetá, La Pedrera and vicinity, Quebrada Tonina. “Large tree. Yukuna = *koo-peé*; Kuripako = *koo-á-see*; Kabuyari = *maú-pa*; Puinave = *boo-kwan*; Tanimuka = *ree-ká-wa-ree-ka*.” October 5, 1952, *Schultes & Cabrera 17728*.

***Moronobea riparia* (Spruce) Planchon & Triana**  
var. ***fimbrillata* R. E. Schultes var. nov.**

Arbor usque ad sexaginta pedes alta, riparia, a *Moronobea riparia* pedicellis multo crassioribus et longioribus, petalis apicem versus conspicue fimbrillatis (non integris), albido-viridibus (non albis) atque latice laete flavo (non viridi) principaliter differt.

The type of *Moronobea riparia* was collected by Spruce along the Río Casiquiare and its affluents in Venezuela, not far from the locality of the three Colombian collections cited below.

An examination of a duplicate type of *Moronobea riparia* (Spruce 3350) in the Gray Herbarium shows that the petals do not have the fimbrillate margin near the apex, which is very conspicuous in the Colombian collections upon which I am basing this new variety. This fimbrillate margin, together with the general tendency for the petals to be somewhat greenish and the bright yellow latex, would seem to indicate that we have at hand a geographic variant which is best treated as a variety.

The otherwise excellent drawing of *Moronobea riparia* in Martius' *Flora Brasiliensis* 12, pt. 1 (1886) t. 106 errs in depicting for this species acute petals. The petals in the Gray Herbarium specimen of Spruce 3350 are broadly rounded, albeit, in aestivation, the imbricate condition of the bud gives the superficial impression of acute petals.

Like that of other species of the genus, the latex of *Moronobea riparia* var. *fimbrillata* is employed for various household uses by the Indians along the Río Guainía.

Because of its very rugose bark, however, it is harder to bleed than *Moronobea coccinea*.

COLOMBIA: Comisaría del Vaupés, Río Guainía, Puerto Colombia and vicinity (opposite Venezuelan town of Maroa). Alt. about 800–850 feet. General location: Lat. 2°40' N, Long. 67°30' W. "Flowers greenish white. Stigma and pistil bright green. Latex bright yellow. Bark thick, scaly, dark brown, corky. Tree storied. Height 40 feet. Diameter 14 inches. Kuripako = *ma-rá-ke*. Spanish = *brea*. Geral = *i-rai-kee*." October 31–November 2, 1952, *Richard Evans Schultes, Richard E. D. Baker & Isidoro Cabrera 18206* (TYPE in Herb. Gray).—Same vicinity and date. "Tree with storied branches. Height 60 feet. Latex yellow. Flowers greenish white. Stigmas bright green. Diameter 18 inches. Bark rough, shaggy, very dark brown. Puinave = *möm*." *Schultes, Baker & Cabrera 18210*.—Same vicinity and date. Raudal del Sapo. "Tree, 45 feet tall. Branches storied. Latex yellow. Bark thick, corky, shaggy, dark brown. Flowers white, petals slightly green-tinged. Pistil bright green." *Schultes, Baker & Cabrera 18221*

***Moronobea riparia* (Spruce) Planchon & Triana**  
var. ***piraparanensis* R. E. Schultes var. nov.**

Arbor viginti quinque pedes alta, riparia, a *Moronobea riparia* foliis majoribus, apice subacutis (nec late rotundatis nec conspicue indentatis) atque floribus majoribus (petalis obliquuo-orbicularibus, 7 cm. × 7 cm.) principaliter differt.

This new variety, like *Moronobea riparia* itself, is conspicuous in the genus in having a curious greenish or greenish yellow latex.

The collection *Schultes & Cabrera 17147* is sufficiently distinct in its leaf and petal characters to warrant varietal recognition. Along the creeks and brooks emptying into the middle course of the Río Piraparaná, *Moronobea riparia* var. *piraparanensis* is rather abundant. The Barasana and Makuna Indians of the region employ the latex for making torches and for caulking canoes.

COLOMBIA: Comisaría del Vaupés, Río Piraparaná, Caño Oomooña. "Small tree on waterside. Height 25 feet. Flowers white, stigma green. Latex greenish yellow. Makuna = *gö-hé-gö*; Barasana = *ö-fě-gö*;

Puinave = *koo-an.*'' September 3, 1952, *Richard Evans Schultes & Isidoro Cabrera 17147* (TYPE in Herb. Gray).

***Moronobea rupicola* R. E. Schultes sp. nov.**

Arbor mediocris, usque ad duodecim pedes alta. Truncus aliquid contortus, 8 poll. in diametro, cortice molli, fusco rimosoque, latice copioso, flavo. Ramuli cortice rufo-fusco densissime foliosi, internodiis plusminusve 8 cm. longis. Folia firme subcoriacea, supra nitida atroviridiaque, infra pallidiora, breviter petiolata (petiolis 6–10 mm. longis, aliquid complanatis), obovata, apice brevissime et abrupte acuminata, basi cuneata, margine leviter marginata, usque ad 8–8.5 cm. longa, 4 cm. lata, nervis lateralibus 0.7–1 mm. inter se distantibus. Flores terminales, citrini sed petala basim versus pallide rosea. Pedicelli brevissimi 4–6 mm. longi, crassi, rosei. Sepala valde inaequalia, crasse chartacea; duo exteriora orbiculata, margine integra, conspicue rugulosa, plusminusve 5 mm. longa, 7 mm. lata; interiora similia sed majora, 8 mm. longa, 10–12 mm. lata. Petala cucullata, extus subvelutina, obliquuo-ovata, apice rotundata vel saepe subacuta, margine integra, 3.5–4 cm. longa, 3.5 cm. lata. Discus infrastamineus annularis, inter staminum adelphas in lobulos sanguineos carnosulos tumens. Synandrium plusminusve 2.5 cm. longum, contortum, phalangibus plerumque 3-andris. Ovarium glabrum, obscure sculptum, oblongo-ovoideum, 1.5 cm. longum. Stylus 1.5 cm. longus, in brachia 1–1.5 mm. longa exiens, ultra petala non exsertus. Fructus adhuc ignotus.

*Moronobea rupicola* appears to be most closely allied to *M. ptaritepuiana* Steyerl., native to Cerro Ptari-tepuí in Venezuela, the flora of which has many elements in common with that of Cerro Isibukuri. The former species can be distinguished from the latter at once by its abruptly acuminate (instead of apically rounded)

leaves which are larger, by having three (instead of five) anthers in each staminal bundle, by its much shorter pedicels and by its lemon-yellow and basally pink (instead of greenish white and apically pink) petals.

The bright yellow latex of *Moronobea rupicola* is utilized by the Kabuyarí and Taiwano Indians of the Río Kananarí for making slow-burning torches, which are the source of light at festivals and dances in large communal houses.

COLOMBIA: Comisaría del Vaupés, Río Kananarí, Cerro Isibukuri. Alt. 250–700 m. “Tree 35–40 feet tall. Diameter 8 inches. Latex yellow. Flowers yellow, base of outer part of petals slightly pink-tinged. Half way up the mountain.” August 4, 1951, *Richard Evans Schultes & Isidoro Cabrera 13384* (TYPE in Herb. Gray).—Same locality. “Flowers yellow.” October 29, 1951, *Schultes & Cabrera 14525*.

***Platonia insignis* Martius var. *formosa* R. E. Schultes var. nov.**

Arbor enormis, usque ad 90 ped. alta, trunco usque ad 1 m. in diametro, a *Platonia insignis* petalorum parte exposita margine auri usu valdissime revoluta, styli brachiis multo longioribus atque sepalis vulgo minoribus principaliter differt.

It might seem that the differences upon which *Platonia insignis* var. *formosa* are based are trivial. The peculiar folding back of the exposed parts of the imbricated petals, however, is so conspicuous that it lends the flowers a very distinctive appearance. There is occasionally some slight folding back of the petals in *Platonia insignis*, but an examination of ample material from Brazil, the Guianas and Venezuela and a study of the description and drawing in Martius' *Flora Brasiliensis* convince me that usually the petals are not at all revolute and that, in those few cases where they are, this condition is slight and wholly confined to the very margin. In the variety here described, the folding back is, as I have

stated in the diagnosis, "in the manner of an ear," the rolled-back portion measuring from 5 to 8 mm. in width from the edge, in material preserved in alcohol.

The fruit of *Platonia insignis* var. *formosa* is a large, fleshy, edible bacca. It is a favorite food of the Indians in season and, for this reason, the tree is always spared when new plots are being cleared for agriculture. The extraordinarily abundant, thick, yellow resin is employed in much the same ways as the resinous latexes of *Moronobea* and *Symphonia*.

COLOMBIA: Comisaría del Vaupés, Río Piraparaná (tributary of Río Apaporis), Raudal Guá-kö-nö-ta. General location: Between Lat.  $0^{\circ}15'$  S, Long.  $70^{\circ}50'$  W and Lat.  $0^{\circ}25'$  N, Long.  $70^{\circ}30'$  W. "Flowers rose-red. On sand at river's edge. Latex yellow. Stamens bright yellow. Makuna = gö-hé-ree-ka; Puinave = kö." September 4, 1952, Richard Evans Schultes & Isidoro Cabrera 17168 (TYPE in Herb. Gray).—Same locality, Raudal de la Olla. "Tree 25 m. Columnar. Bark grey-brown, rough with scales. Flowers salmon-pink. Petals curl out at edge. Receptacle thick, same colour. Latex cream-coloured. On rocks at falls. Crown not large. Tanimuka = oo-ká-o-ree-ke; Yukuna = he-pé-la." August 28, 1952, Schultes & Cabrera 17062.—Same locality, Raudal Koro. "Same as 17062, but flowers lighter salmon and wings of petals pale violet. Latex yellow. Tall tree." August 30, 1952, Schultes & Cabrera 17089.—Comisaría del Vaupés, Río Vaupés, between Mitú and Javareté, Araracachivera. "Low tree. Latex yellow. Flowers salmon-pink. Pedicel fleshy." May 14–24, 1953, Schultes & Cabrera 19395.

***Symphonia globulifera* Linnaeus fil. Suppl. (1781) 302.**

Im Thurn, the explorer of British Guiana, reported (Holland, J. H. : "The useful plants of Nigeria" in Kew Bull. ad. ser. 9, pt. 1 (1908) 62) that a wax prepared by mixing the resin of *Symphonia globulifera* with bees' wax and charcoal was employed by the Indians of British Guiana for cementing arrow heads and joining wood.

In Costa Rica (Pittier, H. : "Plantas usuales de Costa Rica" (1908) 80), the resin of *Symphonia globulifera* is mixed with wax and employed in making candles and as a caulking pitch.

According to Corrêa (Corrêa, P.: "Flora do Brasil" (1909) 15), the resin of *Symphonia globulifera* finds medicinal, veterinary and industrial uses in Brazil. Likewise it is valued in caulking and as a substitute for cobblers' wax ("A glossary of useful Amazonian flora" Coord. Inter-Amer. Aff. (mimeographed) p. 6). In Colombia, the resin, which is known as *paramán* and in the Amazonian regions as *brea*, is used for caulking the seams of boats (Pérez-Arbeláez, E.: "Plantas útiles de Colombia" (1947) 381). In the Peruvian Amazon, *Symphonia globulifera* is known as *brea-caspi* ("pitch tree") (Williams, L.: "Woods of northeastern Perú" in Field Mus. Nat. Hist. Bot. Ser. 15 (1936) 343).

The abundant, thick yellow latex of *Symphonia globulifera* is gathered in large quantities by the Makuna and Barasana Indians of the Río Piraparaná and the lower Apaporis basin for use in making torches and dancing masks, for caulking dugout canoes and for finishing the ends of poison dart quivers made of *Ischnosiphon* stems. It is also employed as a general-purpose glue in making many household articles, such as the hollow bird-bone snuffing tubes and snail-shell snuff-cases.

In the Puinave language, *Symphonia globulifera* is known as *kö*, an epithet which is sometimes applied to other species of the same genus.

COLOMBIA: Comisaría del Vaupés, Río Piraparaná, Caño Oo-moo-ña. "Large tree. Height 60 feet. Flowers red. Latex yellow. Bark brown. Puinave = *kö*." September 3, 1952, Richard Evans Schultes & Isidoro Cabrera 17163.

### ***Symphonia microphylla* R. E. Schultes sp. nov.**

Arbor parva, usque ad quadraginta quinque pedes alta, debilis sed erecta, copiose resiniflua, latice flavo. Rami late strato-patentes. Ramuli teretes, cortice cinereo, dense foliati. Petiolus crassiusculus, 3–4 mm. longus. Folia rigide subcoriacea, supra nitida et atroviridia, infra pal-

lidiora, oblanceolata, apice obtusa, basi cuneata, margine valde revoluta, plerumque 4.5 cm. longa, 1.5 cm. lata, nervis lateralibus numerosis, supra obscuris sed infra prominulis, inter se 0.5–1 mm. distantibus. Inflorescentiae abbreviatae, in ramulis lateralibus sessiles, umbelliformes, ramulis floriferis dense foliatis. Pedicelli in quoque fasciculo 6–8, straminei, plusminusve 8 mm. longi, basi bracteolis minutis, usque ad 1 mm. longis. Alabastrum subglobosum, 5–6 mm. in diametro. Sepala purpurea, subaequalia, subcrassa, late ovata, apice rotundata, margine integra, circiter 2 mm. longa, 2–2.2 mm. lata. Petala sanguinea apicem versus saepe purpurea, aestivatione non contorta, firme membranacea, valde cucullata, orbicularia, 9 mm. lata, margine integra, 8–9 mm. longa, utrinque glaberrima. Discus extrastaminalis 1.2–1.5 mm. altus, valde incrassatus. Synandrium atropurpureum, tubo lageniformi petalis subaequali, 6–7 mm. longum, laciniis maxime crassissimis, rugosis, lineari-triangularibus, stylum versus arcuatis, transversale triangularibus, 2–2.3 mm. longis, 1.8 mm. latis, parte tubiformi 3–3.2 mm. longa, antheris linearibus, ternis, flavis, 1.8 mm. longis, 0.6 mm. latis. Ovarium glabrum, oblongo-ovoideum, 2.8 mm. longum, 1.8 mm. in diametro, in stylum 4 mm. longum, apice profunde stellatim quinquedivisum, brachiis crassissimis, 2.2 mm. longis, attenuatum. Fructus adhuc ignotus.

*Symphonia microphylla* can be distinguished at once from the other two species of the genus through its very small, oblanceolate, obtuse leaves which are not grouped exclusively at the tips of the branchlets but are borne more or less along most of their length. The flowers are smaller than those of *Symphonia globulifera*, and the umbels are fewer-flowered and less dense than those of *S. utilissima*. In floral structure, the lobes of the synangium are much fleshier, and the stigma-bearing arms of the

style are much more carnose and longer than in either *Symphonia globulifera* or *S. utilissima*.

The resinous pitch obtained from *Symphonia microphylla* is employed by the Taiwano and Kabuyarí Indians of the Río Kananarí for the same purposes as that of *S. globulifera*.

COLOMBIA: Comisariás del Vaupés and Amazonas, Río Apaporis, Raudal de Jirijirimo. "Flowers red. Tree, 45 feet tall. Latex yellow, used as brea. Puinave = *kö*; Yukuna = *main*; Kuripako = *maí-ne*." November 27, 1951, *Richard Evans Schultes & Isidoro Cabrera 14662* (TYPE in Herb. Gray).

***Symphonia utilissima* R. E. Schultes sp. nov.**

Arbor parva, usque ad quadraginta quinque pedes alta, nunc gracilis et inter vicinas subscandens vel eis suffulta, nunc robustior et erecta, copiose resiniflua, latice flavo. Rami late strato-patentes. Ramuli teretes, cortice cinereo, apice dense foliati, internodiis 15–17 cm. longis. Petiolus leviter canaliculatus, 4–5 mm. longus. Folia subcoriacea, supra nitida et atroviridia, infra pallidiora, elliptica, longe acuminata, basi cuneata, 6–7 cm. longa, 2–2.3 cm. lata, nervis lateralibus numerosis, inter se plusminusve 1 mm. distantibus, utrinque aequaliter prominulis. Inflorescentiae abbreviatae, in ramulis lateralibus sessiles, umbelliformes, ramulis floriferis dense foliatis, internodiis brevibus, 4–5 cm. longis. Pedicelli in quoque fasciculo saepissime 8–12, flavo-virides, 8–10 mm. longi, basi bibracteolati bracteolis sanguineis, minutissimis. Alabastrum globosum, 4–6 mm. in diametro. Sepala subcoriacea, roseo-violacea, suborbicularia, plusminusve 3 mm. longa, 4 mm. lata. Petala aliquid crassa, sanguinea, aestivatione contorta, valde cucullata, orbicularia, 6–8 mm. longa et lata, margine integerrima, extus parte inclusa levi, exposita crassiore atque rugulosa. Discus extrastaminalis 0.8–1 mm. altus. Synandrium sanguineum, tubo lageniformi quam petala brevior, 4 mm.

altum, laciniis linearibus, acutis, rugulosis, 2.5 mm. longis, 1 mm. latis, parte tubiformi 2 mm. longa, antheris linearibus, ternis, flavis, 1.2 mm. longis, 0.5 mm. latis. Ovarium glabrum, subglobosum, plusminusve 1.2 mm. in diametro, in stylum 2 mm. longum, apice stellatim quinquefidum, brachiis crassis, 1 mm. longis, attenuatum. Fructus adhuc ignotus.

*Symphonia utilissima* differs from *S. globulifera* in its smaller, elliptic, very long-acuminate (instead of oblong or oblong-lanceolate, short-acuminate) leaves and in its much smaller flowers which are grouped more densely in umbels of from eight to twelve (instead of from three to seven).

This tree is of prime importance in the economy of the natives of the Apaporis basin. Its abundant yellow latex is gathered for use in caulking dugout canoes, and the Makuna, Tanimuka and Yukuna Indians make dancing-masks from the pitch which, when boiled, becomes black, and hardens into a firm, brittle and glossy material. The pitch from *Moronobea coccinea* is likewise used in the manufacture of the dancing masks, but *Symphonia utilissima* appears to be much more abundant in the flood-forests and more easily bled than *M. coccinea*.

COLOMBIA: Comisaría del Vaupés, Río Apaporis, Jinogojé. "Small tree. Flowers red. Latex yellow. Highland. Spanish = *brea*; Tanimuka = *ma-ñé* and *ree-ka-vá*; Yukuna = *main*; Puinave = *kö* and *kö-lö*; Kuripako = *maí-ne*; Makuna = *go-hé-ree-ka*." August 17, 1952, Richard Evans Schultes & Isidoro Cabrera 16885 (TYPE in Herb. Gray).

## EXPLANATION OF THE ILLUSTRATION

PLATE V. (*Upper*) Flowering branch of *Moronobea riparia* (Spruce) Planchon & Triana var. *fimbrillata* R. E. Schultes. Río Guainía, Vaupés, Colombia.

(*Lower*) Flowers of *Moronobea coccinea* Aublet from the tree which gave the collection *Schultes & Cabrera 13960*. Mitú, Río Vaupés, Vaupés, Colombia.

*Photographs by* RICHARD EVANS SCHULTES